

Parent-child interactions and adolescent anxiety: a systematic review

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Parent-Child Interactions and Adolescent Anxiety: A Systematic Review

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Abstract

Parental behaviours have been implicated in the development and maintenance of anxiety in children and young people; however the degree to which findings apply to adolescents specifically remains unclear. We conducted a systematic review of studies examining the evidence for an association between parental behaviours and adolescent anxiety. Twenty two studies were identified. The results of this systematic review provide fairly consistent preliminary evidence for an association between anxiety and perceived parental control and anxious rearing in adolescence. The findings relating to an association between adolescent anxiety and perceived parental rejection and lack of warmth are somewhat less consistent. Methodological shortcomings in the studies mean that these results should be interpreted with caution. Future research should be conducted using observational and experimental design with adolescents from referred, clinical populations to help identify the critical parental processes and clarify the direction of effects.

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Keywords: adolescent, anxiety, parenting, systematic review

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Introduction

Adolescent Anxiety

Anxiety disorders are among the most common mental health problems experienced by children and young people (Costello, Egger, & Angold, 2005) and, if left untreated, typically persist into adulthood and impact negatively on life course outcomes (Last, Hansen, & Franco, 1997; Pine, Cohen, Gurley, Brook, & Ma, 1998). The evidence suggests that, as children move into adolescence, particular anxiety disorders become more common (Costello, Copeland, & Angold, 2011) with increased rates of panic disorder, agoraphobia and obsessive compulsive disorder among both sexes (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Ford, Goodman, & Meltzer, 2003) and increased rates of social phobia in girls (e.g. Costello et al., 2003). There also appear to be higher levels of co-morbid depression in adolescents with an anxiety disorder compared to children (e.g. Kendall et al., 2010).

The increased rates of particular anxiety disorders and co-morbid depression in adolescence, compared to childhood, may not be surprising given that adolescence is a critical transitional period between childhood and

adulthood and a time of huge biological, psychological and social change (Feldman & Elliott, 1990; Holmbeck et al., 2000). Despite this, most research to date has been conducted with adults or younger children, leaving adolescents with anxiety as an under-researched group (Kendall & Ollendick, 2004). Similarly, evidence-based treatments have been developed principally for adults (Weisz & Hawley, 2002) or for children most typically aged between 7 and 14 years (Kendall & Ollendick, 2004). Where treatments are available specifically for adolescents with anxiety, they are often developed for younger age groups and then subsequently adapted for adolescents. While generally effective, there remains considerable room for improvement. The identification of factors associated with the development and maintenance of anxiety disorders in adolescents is clearly required to improve both our understanding and treatment outcomes.

The Role of Parenting in the Development and Maintenance of Childhood Anxiety

Theoretical models have stressed the importance of family factors in the development and maintenance of anxiety in children and young people (e.g. Creswell, Murray, Stacey, & Cooper, 2011; Hudson & Rapee, 2004) and include a broad range of factors, such as genetics, parental anxiety and/or depression, adverse life events, as well as parenting behaviours. The aetiology and maintenance of anxiety is likely to be multifactorial and the relative contribution of different factors remains unknown. Nevertheless, there is a great deal of research suggesting that parent behaviours may be an important contributory factor (Rapee, Schniering, & Hudson, 2009).

Typically the research literature on parenting and anxiety in children and young people has been divided into the two broad dimensions of control and rejection (e.g. McLeod, Wood, & Weisz, 2007; Rapee, 1997; Rothbaum & Weisz, 1994). The dimension of parental control is characterised by over-involvement, where the child is encouraged to be excessively dependent on the parent, in an attempt to protect the child from harm, and a lack of autonomy-granting, where the parent does not encourage the child to develop their own opinions and make decisions for themselves (Rapee, 1997). It has been suggested that a lack of autonomy-granting may prevent children from developing a strong sense of self-efficacy and that this increases their sense of vulnerability to threat and heightened anxiety (Chorpita & Barlow, 1998; Wood, 2006). The second dimension, parental rejection, involves withdrawal from or hostility towards the child and a lack of warmth, involvement, emotional support or reciprocity with the child. This is hypothesized to undermine the child's emotion regulation, thus increasing their sensitivity to anxiety (McLeod et al., 2007). From their meta-analysis of 47 studies examining the association between childhood anxiety and parenting, McLeod et al. (2007) found a medium sized association between parental control and child anxiety, but a small association between parental rejection and child anxiety. Van der Bruggen, Stams and Bögels (2008) also found child anxiety to be significantly associated with observed parental control, with a medium overall effect size. Findings from experimental studies have further supported a maintaining role of parental controlling behaviours by demonstrating that increasing parental controlling behaviours leads to increased anxious responses among children and young people, at least among more inhibited children (de Wilde & Rapee, 2008; Thirlwall & Creswell, 2010). In addition to the two broad constructs of control and rejection, it has been hypothesised that parents may influence the development and maintenance of anxiety in children and adolescents through modelling and reinforcing anxious behaviour (Rachman, 1977). Where this has been evaluated some studies have considered a broad concept of parental anxious rearing behaviour, where parents encourage anxious cognitions and avoidance behaviour in their child (e.g. Barrett, Rapee, Dadds, & Ryan, 1996; Grüner, Muris, & Merckelbach, 1999) and there is some evidence that children's perceptions of parental anxious rearing is associated with higher levels of child anxiety (Grüner et al., 1999; Waters, Zimmer-Gembeck, & Farrell, 2012). Furthermore, experimental and prospective longitudinal research has shown that observing parents responding in an anxious manner leads to an increase in children's anxious responses (e.g. De Rosnay, Cooper, Tsigras, & Murray, 2006; Gerull & Rapee, 2002).

In summary, there is evidence that parental behaviour that restricts autonomy and models anxious responses is associated with increased anxiety symptoms and anxiety disorders in youth, and that these may have a maintaining role. Evidence relating to parental rejection is less consistent. The majority of studies examining the associations between parenting styles and anxiety in childhood that have been conducted to date, however, have included children and young people from broad age ranges. Thus, to be included in McLeod et al.'s (2007) meta-analysis, the mean age of participants in studies had to be less than 19 years, and studies ranged from a mean

age of 2.0 years to 18.8 years. While mean age was examined as a potential moderator in this review, the included studies did not typically group children and adolescents into cohorts based on distinct developmental stages, so the extent to which the findings apply to adolescents remains unclear. This is an important consideration as the normative function and role of parents in development changes dramatically as children move into and through adolescence (Furman & Buhrmester, 1992).

Parenting in Adolescence

Although adolescence is a period of increasing separation and developing independence, evidence confirms the importance of the family unit during this period and that parents continue to exert significant influence on their adolescent (e.g. Feldman & Elliott, 1990; Garnezy & Rutter, 1983). It is commonly believed that one of the central tasks as a parent during this developmental stage is to encourage the adolescent's autonomy (Hill & Holmbeck, 1986; McElhaney, Allen, Stephenson, & Hare, 2009) so that the adolescent can learn to make their own decisions and choices in life and move towards functioning independently (Soenens, Berzonsky, Vansteenkiste, Beyers, & Goossens, 2005). This is then hypothesised to lead to better adjustment and psychosocial functioning (Deci & Ryan, 2000). As part of this process, typically adolescents' relationships with their parents undergo a stressful period during early and middle adolescence, as the family negotiates issues of control and autonomy (Paikoff & Brooks-Gunn, 1991; Steinberg, 1990). Given the central role of parental control in many theories of childhood anxiety and the normative developmental role of parents in adolescence, specific consideration of the association between parental behaviours and anxiety in adolescence is required. One possibility, for example, is that parental control may be particularly problematic in terms of anxiety during adolescence when the young person may require a particular parental focus on autonomy promotion. Or, alternatively, parental behaviours may generally be less influential during adolescence, compared to childhood, as young people become more open to influence of others, such as peers, beyond the immediate family (Furman & Buhrmester, 1992).

Although meta-analyses indicate no significant difference between child only and child and parent interventions for anxiety disorders in childhood and adolescence (e.g. Reynolds, Wilson, Austin, & Hooper, 2012), few studies have been sufficiently powered to address differential effects of parent-focussed interventions at different child ages and where this has been addressed results have been inconsistent. For example, Barrett, Rapee and Dadds (1996) and Cobham, Dadds and Spence (1998) found no added benefit from adding a parental component to individual CBT among their older groups (aged 11-14 years), but did find a benefit in terms of child treatment outcomes for younger children. Boddén et al. (2008), however, failed to find improved outcomes from including a parental component regardless of the child or young person's age. It is unclear whether these different findings reflect differences in the content of the interventions delivered with parents across studies or differences in the degree to which parental responses were modified by the interventions. Thus, it remains unclear whether changing parental behaviours may be more or less pertinent to treatment outcomes at particular child ages.

Summary

In summary, particular anxiety disorders in adolescents are more common than in younger age groups and appear to be more frequently co-morbid with depression. Despite this, there is a paucity of research that is specifically focussed on anxiety in adolescence, with the majority of studies focussing on younger children. Parental behaviours have been implicated in the development and maintenance of anxiety in children and young people, however research has typically included children and young people from broad age ranges so the degree to which findings apply to adolescents specifically remains unclear. The aim of this review, therefore, is to examine the evidence for an association between parenting behaviours and anxiety in adolescence.

Method

Inclusion Criteria

To be included in the review, studies had to meet the following inclusion criteria:

1. Published as a full paper in a peer-reviewed journal.

2. All participants within a distinct group are aged between 11 (or the equivalent year or grade of education if age was general) and 18 years. For longitudinal analyses, adolescent anxiety is assessed and analysed during time points within this age range.
3. Include a standardised measure of adolescent anxiety or the adolescent has been diagnosed with an anxiety disorder. If the measure is of internalizing problems, symptoms of anxiety and depression must be differentiated for the analysis in order to ensure that there is a measure of anxiety. Studies of adolescents with a medical condition (e.g. diabetes) are not included.
4. Include a measure of parenting during the adolescent period in relation to a specific adolescent and the association between parenting and adolescent anxiety is tested significantly. Studies are excluded if they do not include a direct measure of parenting (e.g. studies of attachment or family environment are not included), or do not include a target adolescent.
5. Written in English. Non-English papers were documented, but were not included in the review due to of a lack of resources and facilities for translation.

Preliminary Search Strategy

The literature search was conducted using Web of Science (1970 to July 2013) and the NHS Evidence Healthcare Databases (formerly The National Library for Health databases) which incorporates results from MEDLINE (1950 to July 2013), PsychInfo (1806 to July 2013) and EMBASE (1980 to July 2013). Consistent with McLeod et al.'s (2007) meta-analysis, we used 12 anxiety-related key terms: *internaliz**, *anxi**, *worry*, *fear**, *obses**, *compul**, *OCD*, *panic*, *phobi**, *inhibit**, *shy** and *somat**. These were crossed with key terms to identify parenting dimensions: *mother*, *maternal*, *father*, *paternal*, *parent**, *rearing*, *parent* style*, *parent* behav** and *expressed emotion*, and key terms to identify studies involving adolescents: *adol**, *youth* and *teenage**.

In addition, reference lists of primary studies identified by the database searches were scanned to identify further studies of interest. The key journals were identified by analysing the results of the database searches to identify the journals that contained the largest number of relevant studies. They were then hand searched, in particular to identify recent publications that had not yet been included and indexed by electronic databases.

Study Selection

The selection process was piloted by applying the inclusion criteria to a sample of papers in order to check that they could be reliably interpreted and that the studies were classified appropriately. This phase was used to refine and clarify the inclusion criteria. Two of the authors (PW and LW) independently screened titles and abstracts and then full papers. Any disagreements about study eligibility were discussed and resolved by consensus with the third author (CC) after referring to the protocol. Inter-assessor reliability for whether studies met the inclusion criteria was high ($K = .87$). Figure 1 presents the flow chart that shows the number of studies remaining at each stage, following guidelines from PRISMA (Moher, Liberati, Tetzlaff, & Altman, 2009). Where studies met more than one exclusion criteria, the primary exclusion criterion is shown.

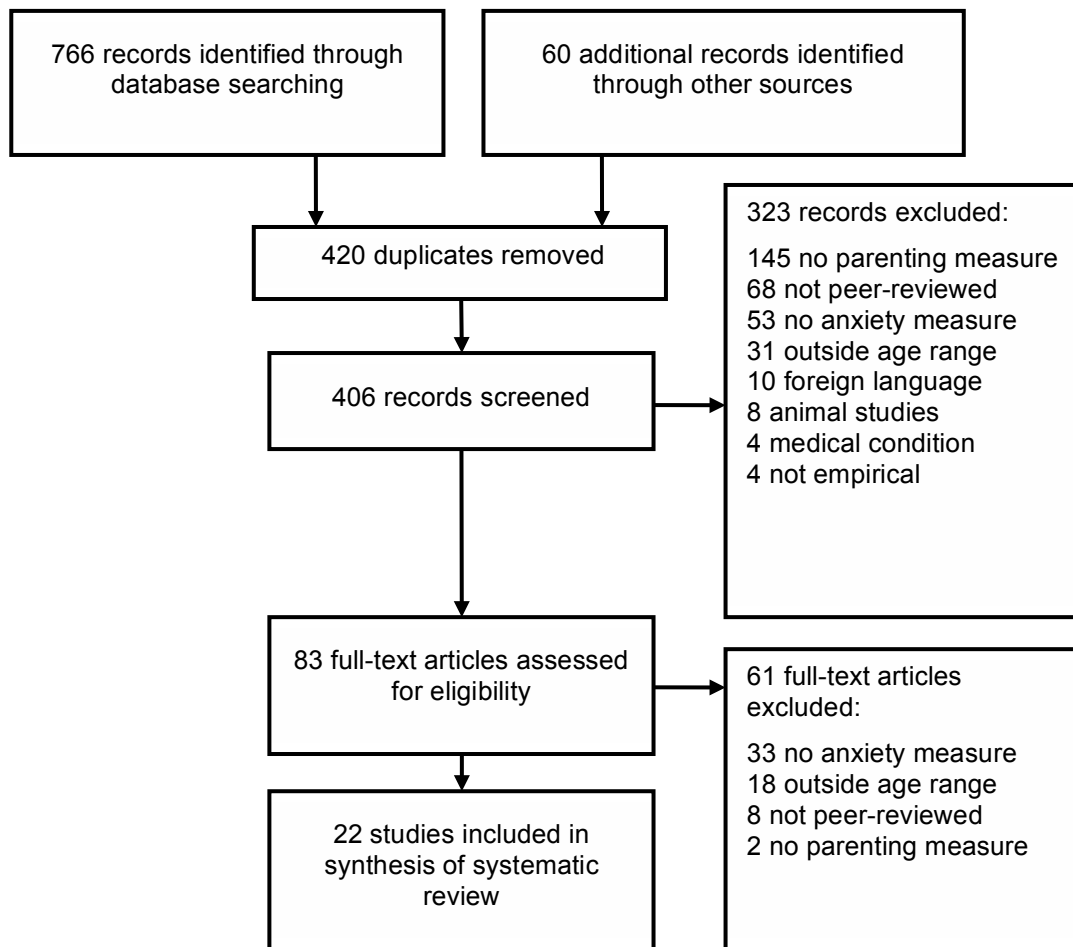


Figure 1: Flow of information through the different phases of the systematic review.

Data Extraction

For each study, the following information was extracted: (a) background and demographic information including study location, setting and design, whether it was part of a larger study, family status, parents' years of education, ethnicity, socio-economic status; (b) number of participants; (c) adolescent age range and mean age; (d) for longitudinal studies, assessment time points; (e) gender of adolescent; (f) gender of parent; (g) parenting behaviour; (h) how the parenting behaviour was measured (i.e. questionnaire, interview or observation); (i) parenting measure used; (j) informant for parenting behaviour (i.e. adolescent, parent, observer); (k) type of adolescent anxiety (i.e. symptoms and/or disorder of social anxiety, generalised anxiety, separation anxiety, specific phobia, panic or agoraphobia or general anxiety symptoms); (l) how adolescent anxiety symptoms and/or disorder were measured (i.e. questionnaire or interview); (m) anxiety measure used; (n) informant for adolescent anxiety (i.e. adolescent, parent, teacher); (o) whether the adolescent had been diagnosed with an anxiety disorder; (p) if an intervention took place; (q) symptoms of co-morbid problems (i.e. low mood, substance abuse/dependence, behaviour problems, neurodevelopmental disorders); (r) how co-morbid symptoms were measured (i.e. questionnaire or interview); (s) informant for adolescent co-morbid symptoms (i.e. adolescent, parent or teacher); (t) parental psychopathology (i.e. anxiety or depression); (u) how parental psychopathology was measured (i.e. questionnaire or interview); (v) method of data analysis; (w) findings; (x) effect sizes and (y) any ethical issues or sources of bias.

Two researchers (PW and LW) extracted the data and as before, discrepancies were resolved by consensus with the third author (CC) after referring to the protocol. Where there was missing data or additional data needed (e.g. age ranges or missing correlation coefficients), authors of studies were contacted. The bibliographic software,

EndNote, was used to import references from electronic databases and record and manage references. Microsoft Access 2010 was used to create a 'library' of references and fields were customised to enable information and decisions to be recorded and this was managed by PW.

Data Synthesis

Due to the heterogeneity of studies in this review (i.e. participants, type of anxiety measured, informants, measures used, study design), the findings of the studies were evaluated through a systematic review rather than a meta-analytic approach, as a meta-analysis could be misleading as biases in individual studies would be compounded and synthesising studies in this way could give credence to poor quality studies (Centre for Reviews and Dissemination, 2008). In addition, effect sizes were examined for each study. Most studies reported effects sizes in terms of Pearson's product-moment correlation coefficient r . Where studies involved group comparisons and did not provide effect sizes, these were then calculated as r . Where studies reported only standardised multiple regression coefficients, rather than correlation coefficients, we contacted authors to obtain the original correlation coefficients. If they were not available, we used Peterson and Brown's (2005) imputation approach to convert β coefficients to corresponding correlation coefficients (r). Once all effect sizes were converted to r , they were then interpreted using Cohen's (1988) definition of an effect size of at least .10 as 'small', at least .24 as 'medium' and at least .37 as 'large'.

Study Sample

The 22 studies identified through literature search were published from 1988 to 2012. Fifteen of the studies were cross-sectional (Caster, Inderbitzen, & Hope, 1999; Fisak & Mann, 2010; Hale III, Engels, & Meeus, 2006; Hernandez-Guzman & Sanchez-Sosa, 1996; Hudson & Rapee, 2001; Kohlmann, Schumacher, & Streit, 1988; McClure, Brennan, Hammen, & Le Brocque, 2001; Muris, 2002; Muris, Meesters, Schouten, & Hoge, 2004; Niditch & Varela, 2012; van Brakel, Muris, Bögels, & Thomassen, 2006; Vazsonyi & Belliston, 2006; Verhoeven, Bögels, & van der Bruggen, 2012; Wilson et al., 2011; Wolfradt, Hempel, & Miles, 2003). Four of these cross-sectional studies (Hale III et al., 2006; Hudson & Rapee, 2001; Vazsonyi & Belliston, 2006; Verhoeven et al., 2012) included data for children and adolescents outside the age range of 11-18 years and so only the analyses involving adolescents within this age range are included. Six studies used a longitudinal design (Loukas, 2009; Miller, Brody, & Murry, 2010; Rapee, 2009; Schwartz et al., 2012; Van Zalk & Kerr, 2011; Wijsbroek, Hale III, Raaijmakers, & Meeus, 2011). Three of these longitudinal studies (Loukas, 2009; Miller et al., 2010; Rapee, 2009) only had one distinct time point where adolescents were aged between 11-18 when adolescent anxiety and perceptions of parenting were assessed and therefore findings were included with the cross-sectional studies. One study in the review was a treatment study (Garcia-Lopez, Muela, Espinosa-Fernandez, & Diaz-Castela, 2009) and none of the studies involved an experimental design.

Six studies were conducted in the Netherlands (Hale III et al., 2006; Muris, 2002; Muris et al., 2004; van Brakel et al., 2006; Verhoeven et al., 2012; Wijsbroek et al., 2011), five studies were conducted in the United States (Caster et al., 1999; Fisak & Mann, 2010; Loukas, 2009; Miller et al., 2010; Niditch & Varela, 2012), four studies were conducted in Australia (Hudson & Rapee, 2001; McClure et al., 2001; Rapee, 2009; Schwartz et al., 2012), two in Germany (Kohlmann et al., 1988; Wolfradt et al., 2003), one in Mexico (Hernandez-Guzman & Sanchez-Sosa, 1996), one in Spain (Garcia-Lopez et al., 2009), one in Sweden (Van Zalk & Kerr, 2011), one in the U.K (Wilson et al., 2011) and one involved participants from four countries (Hungary, the Netherlands, Switzerland and the United States; Vazsonyi & Belliston, 2006). Six studies (Caster et al., 1999; McClure et al., 2001; Miller et al., 2010; Schwartz et al., 2012; Van Zalk & Kerr, 2011; Wijsbroek et al., 2011) were part of larger studies. Participants were recruited through schools in all except four studies (McClure et al., 2001; Miller et al., 2010; Vazsonyi & Belliston, 2006; Wijsbroek et al., 2011), where participants were drawn from the community. One study included a referred, clinical population (Hudson & Rapee, 2001).

Table 1: Reviewed studies, population characteristics, presence of anxiety disorder, informant and method of assessment of parenting and adolescent anxiety symptoms.

Study	Sample Size	Age Range (years)	Anxiety Disorder	Parenting Informant	Parenting Measure	Anxiety Informant	Anxiety Measure
Caster et al. (1999)	1756	Grades 7-11 (11-16)	No	Adol/Par	Qu	Adol	Qu
Fisak and Mann (2010)	348	15-18	No	Adol	Qu	Adol	Qu
Garcia-Lopez et al. (2009)	16	15-18	Yes	Par	Int	Adol	Int
Hale III et al. (2006)	580	12-14	No	Adol	Qu	Adol	Qu
Hernandez-Guzman and Sanchez-Sosa (1996)	3432	15-18	No	Adol	Qu	Adol	Qu
Hudson and Rapee (2001)	75	12-15	Yes	Obs	Obs	Adol/Par	Int
Kohlmann et al. (1988)	329	12-14	No	Adol	Qu	Adol	Qu
Loukas (2009)	479	Grades 7-8 (12-14)	No	Adol	Qu	Adol	Qu
McClure et al. (2001)	816	15	Yes	Adol	Qu	Adol/Par	Int
Miller et al. (2010)	176	12-15	No	Par	Qu	Teacher	Qu
Muris (2002)	220	13-16	No	Adol	Qu	Adol	Qu
Muris et al. (2004)	167	11-14	No	Adol	Qu	Adol	Qu
Niditch and Varela (2012)	124	12-18	No	Adol	Qu	Adol	Qu
Rapee (2009)	421	Grade 8 (11-14)	No	Adol	Qu	Adol/par	Qu
Schwartz et al. (2012)	T1 194 T2 ^a 178	T1 11-13 T2 13-16	No	Obs	Obs	Adol	Qu
Van Brakel et al. (2006)	644	11-15	No	Adol	Qu	Adol	Qu
Van Zalk and Kerr (2011)	T1 916 T2 ^b 785 T3 ^b 703	* T1 Grades 7-9 mean = 14.25, T2 Grades 8-10 mean = 15.06, T3 Grades 9-11 mean = 16.01 (SDs not given)	No	Adol	Qu	Adol	Qu
Vazsonyi and Belliston (2006)	6935	15-16	No	Adol	Qu	Adol	Qu
Verhoeven et al. (2012)	127	13-18	No	Adol/Par	Qu	Adol/Par	Qu
Wijsbroek et al. (2011)	T2 1313 T3 ^c	* T2 mean 14.4 (SD .59) (T3 not given)	No	Adol	Qu	Adol	Qu
Wilson et al. (2011)	72	11-16	No	Adol/Par	Qu	Adol	Qu
Wolfradt et al. (2003)	276	14-17	No	Adol	Qu	Adol	Qu

Note. *T* = Time, ^a *T2* took place approximately two and a half years after *T1*, ^b *T2* and *T3* occurred one and two years after *T1*, ^c *T3* took place two years after *T2* and sample size at *T3* was not provided, * Age range not provided, *Adol* = Adolescent, *Par* = Parent, *Int* = Interview, *Obs* = Observation, *Qu* = Questionnaire.

Adolescents and Anxiety

All but one study (Rapee, 2009) involved adolescents of both sexes. Six studies assessed adolescents for symptoms related to social anxiety or shyness (Caster et al., 1999; Fisak & Mann, 2010; Garcia-Lopez et al., 2009; Loukas, 2009; Miller et al., 2010; Van Zalk & Kerr, 2011), four studies assessed symptoms of generalized anxiety (Hale III et al., 2006; Muris, 2002; Wijsbroek et al., 2011; Wilson et al., 2011) and Wijsbroek et al. (2011) also looked at symptoms of separation anxiety. The remaining twelve studies used measures that assessed general anxiety symptoms.

All but four studies (Hudson & Rapee, 2001; McClure et al., 2001; Rapee, 2009; Verhoeven et al., 2012) relied on a single informant to report on the adolescent's anxiety symptoms; this was the adolescent in all studies except Miller et al. (2010), where their sole informant was a teacher. Hudson and Rapee (2001), McClure et al. (2001), Rapee (2009) and Verhoeven et al. (2012) all assessed adolescent anxiety symptoms through both adolescent and parent report. Three studies assessed adolescent anxiety through a diagnostic interview. Hudson and Rapee (2001) and McClure et al. (2001) carried out separate interviews with adolescents and parents. Hudson and Rapee (2001) used either the Anxiety Disorders Interview Schedule for Children (Silverman & Nelles, 1988) or the Anxiety Disorders Interview Schedule - Child and Parent version (ADIS-C/P; Silverman & Albano, 1996), while McClure et al. (2001) used the Schedule for Affective Disorders and Schizophrenia for School-Age Children – Epidemiologic version (K-SADS-E; Orvaschel & Puig-Antich, 1987). Garcia-Lopez et al. (2009) interviewed the adolescents only, using the ADIS-C. In the remaining 19 studies, adolescents completed self-report questionnaire measures, such as the Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997), the State Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970), the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978), the Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998) and the Penn State Worry Questionnaire for Children (PSWQ-C; Chorpita, Tracey, Brown, Collica, & Barlow, 1997). McClure et al. (2001) also measured co-morbid symptoms of depression through diagnostic interview.

Parents and Parenting

Nineteen of the studies involved reports of parenting, or parents themselves, of both sexes, apart from the studies by Hudson and Rapee (2001), Loukas (2009) and Rapee (2009), where the focus was on mothers. Nineteen studies assessed perceptions of parenting through questionnaire measures, such as the Egna Minnen Beträffande Uppfostran: My Memories of Upbringing - Child version (the EMBÜ-C; Castro, Toro, Van der Ende, & Arrindell, 1993) and the Children's Report of Parental Behaviour Inventory (CRPBI; Schludermann & Schludermann, 1988). Both adolescents and parents completed the parenting questionnaires in the studies by Caster et al. (1999), Verhoeven et al. (2012) and Wilson et al. (2011). Sixteen studies relied on the report of a single informant; 15 of the studies relied on adolescent's reports of parenting, whereas Miller et al. (2010) relied on parent's reports of their parenting. In the three remaining studies, Hudson and Rapee (2001) and Schwartz et al. (2012) used an observational measure, in which a parent-child interaction task was videoed and then coded by trained observers and Garcia-Lopez et al. (2009) used a parent interview, the Five Minute Speech Sample (FMSS; Magaña et al., 1986).

Demographic Variables

Twelve studies reported on ethnicity and of these, between 55% and 99% of adolescents were Caucasian (although in the Verhoeven et al. (2012) study, the demographic information was given for the whole sample, rather than just the adolescent group). The majority of the studies did not provide information relating to socio-economic status (SES) or parents' educational background. Where it was reported, three studies (Caster et al., 1999; McClure et al., 2001; Miller et al., 2010) described their participants as low to middle SES, while Rapee (2009) and Wolfradt et al. (2003) described their participants as predominantly middle SES. Verhoeven et al. (2012) reported that 55-61% of parents had completed tertiary education and Miller et al. (2010) reported that this was the case for 75% of parents in their study. Niditch and Varela (2012) reported that in their sample, parents had completed on

average three years of education following high school. Wilson et al (2011) reported that 78% of parents in their study were working.

The majority of the studies did not provide information regarding whether parents were married, co-habiting or single and/or who the adolescent lived with. All the adolescents in Loukas' (2009) study were living with their biological mother. In Miller et al.'s (2010) study, all the parents were married and the biological parents of the adolescent. Verhoeven et al. (2012) reported that 97-98% of participating mothers and fathers across their child and adolescent groups were the biological parent of the child. Van Zalk and Kerr (2011) reported that 68% of families contained both the adolescents' biological parents. Five studies reported that between 81-93.5% of parents were married or co-habiting (McClure et al., 2001; Van Zalk & Kerr, 2011; Verhoeven et al., 2012; Wijsbroek et al., 2011; Wolfradt et al., 2003).

Results

Cross-Sectional Findings

General anxiety symptoms and parenting.

Eleven studies reported cross-sectional associations between general anxiety symptoms and either adolescent perceptions of parenting behaviours (Hernandez-Guzman & Sanchez-Sosa, 1996; Kohlmann et al., 1988; McClure et al., 2001; Muris et al., 2004; Niditch & Varela, 2012; Rapee, 2009; van Brakel et al., 2006; Vazsonyi & Belliston, 2006; Verhoeven et al., 2012; Wolfradt et al., 2003) or observed parenting (Hudson & Rapee, 2001).

Seven of these studies examined cross-sectional relationships between adolescent anxiety and either perceptions or observations of parental control or over-protection (Hudson & Rapee, 2001; McClure et al., 2001; Muris et al., 2004; Niditch & Varela, 2012; van Brakel et al., 2006; Verhoeven et al., 2012; Wolfradt et al., 2003). The study by Hudson and Rapee (2001) involved children and adolescents diagnosed with an anxiety disorder and a non-clinical, community-based comparison group. They observed interactions between mothers and their child or adolescent during two difficult cognitive tasks. In general, mothers of children and adolescents with an anxiety disorder were significantly more involved and intrusive than mothers whose child or adolescent was in the non-clinical group. When the young people were categorised according to age, with a separate category for 12 to 15 year olds, there was not a significant age by group interaction, suggesting that the main effect of group was not modified by the young person's age. Specifically, mothers of adolescents with an anxiety disorder were more controlling than mothers of adolescents in the non-clinical group, and the difference had a medium effect size.

The other six studies examined relationships between adolescent anxiety and their perceptions of, rather than observed, parental control and of these, five studies found significant associations. Effect sizes ranged from small (McClure et al., 2001; Muris et al., 2004; van Brakel et al., 2006; Verhoeven et al., 2012) to medium (Wolfradt et al., 2003). Niditch and Varela (2012) found a small effect for the association between perceptions of parental control and adolescent anxiety for parents of both genders, but the associations did not reach statistical significance. This study had a similar methodology to three of the other studies (Muris et al., 2004; van Brakel et al., 2006; Wolfradt et al., 2003) but a smaller sample and therefore may have not been sufficiently powered to detect a significant difference. While Verhoeven et al. (2012) did find a significant association between perceptions of fathers' over-controlling behaviour and adolescent anxiety symptoms, this was not the case for mothers. The study differed to the other studies in that adolescent anxiety and perceptions of parents were based on the combined reports of parents and adolescents rather than just adolescents, however, when analyses were conducted separately using only adolescent (or parental) reports of parenting, the results did not differ. They also found no significant associations between adolescent anxiety and perceptions of autonomy-granting behaviour for parents of either gender and suggested that autonomy-granting, which is often seen as being at the opposite end of the continuum for the parenting dimension of control, may actually be an entirely separate construct.

Of these studies, only McClure et al. (2001) involved adolescents with a diagnosed anxiety disorder; specifically to investigate the relationship between maternal and adolescent anxiety disorders and in particular, whether perceived parental control was a mediator of this relationship. They found that although adolescent's perceptions of

their mother's psychological control did predict adolescent anxiety disorders, maternal anxiety disorder did not significantly predict adolescent perceptions of maternal psychological control and therefore conditions for establishing mediation were not met. They also examined perceived maternal behavioural (rather than psychological) control, but did not find a significant association with adolescent anxiety disorder status.

In terms of parenting behaviours related to the dimension of rejection or lack of support/warmth, nine cross-sectional studies examined the association with adolescent anxiety. Again, Hudson and Rapee's (2001) study was the only one to examine this relationship through observed, rather than perceived, parenting. They found that mothers of children and adolescents with an anxiety disorder were significantly more negative than mothers whose child or adolescent was in the non-clinical group. As above, when the young people were categorised according to age, with a separate category for 12 to 15 year olds, there was not a significant age by group interaction, suggesting that the main effect of group was not modified by the young person's age. Specifically, mothers of adolescents with an anxiety disorder were more negative than mothers of adolescents in the non-clinical group, and the difference had a medium effect size.

Six of the remaining eight cross-sectional studies (Hernandez-Guzman & Sanchez-Sosa, 1996; Muris et al., 2004; Niditch & Varela, 2012; Vazsonyi & Belliston, 2006; Verhoeven et al., 2012; Wolfradt et al., 2003) found that higher levels of adolescent-rated parental rejection or lack of support/warmth were significantly associated with adolescent anxiety symptoms, with effect sizes in the small to medium range. In addition to the dimension of warmth, Wolfradt et al. (2003) also examined the association between adolescent anxiety and perceived parental pressure and found it to be significant, with a large effect size.

Both Hernandez-Guzman and Sanchez-Sosa (1996) and Vazsonyi and Belliston (2006) found the association between adolescent anxiety and perceptions of parental lack of support or warmth to be significant for both mothers and fathers. Hernandez-Guzman and Sanchez-Sosa (1996) also found a significant association between adolescent anxiety and perceptions of parental rejection for both mothers and fathers. In contrast, Niditch and Varela (2012) and Verhoeven et al. (2012) found differences in associations according to parental gender. Niditch and Varela (2012) found a significant association between adolescent anxiety symptoms and perceptions of mothers' rejecting behaviour, with a medium effect size, but this association was small and non-significant for fathers. They reported, however, that 13 fewer participants in their sample completed the questionnaires for fathers' behaviour and so while this effect was weaker than for mothers, the lack of significance may also reflect a lack of power. Verhoeven et al. (2012), on the other hand, found a significant association between perceptions of rejecting behaviour and adolescent anxiety for fathers only, with a small effect size. These studies are similar in terms of methodology, age of participants and sample size. Although Niditch and Varela (2012) relied exclusively on adolescent report of parenting, when Verhoeven et al. (2012) repeated their analysis using only adolescent reports of parenting their results did not change. The differing findings, therefore, are more likely to be accounted for by the measures of anxiety and parenting used in each study and sample demographics, in that the Niditch and Varela (2012) was carried out in the U.S., rather than the Netherlands, with a much more ethnically diverse sample.

While Niditch and Varela (2012) found that the relationship between perceived maternal rejection and adolescent anxiety was significantly mediated by adolescent emotional self-efficacy, adolescent perceived control was not found to be a significant mediator of this association by Muris et al. (2004). As these studies were very similar in design, this difference in findings may reflect the differing constructs of emotional self-efficacy, which measures the adolescent's beliefs about their competence and ability to cope with negative emotions, and perceived control, which measures the adolescent's beliefs about their ability to exert control in different domains of their life. The difference in findings may also reflect sample characteristics; the mean age of participants in Niditch and Varela's study was higher than those in Muris' study (14.82 years compared to 12.18 years) and participants were from the United States rather than the Netherlands.

Table 2: Cross-sectional associations between adolescent anxiety symptoms by anxiety type and different parenting dimensions.

Study	Anxiety Type	Overprotection / control	Rejection / warmth	Anxious rearing	Modelling of anxiety / lack of sociability	Other
Hernandez-Guzman and Sanchez-Soza (1996)	General	-	Mo: $r = -.17$ – $-.22^{***}$ Warm/Rej \diamond Fa: $r = -.19$ – $-.26^{***}$ Warm/Rej \diamond	-	-	-
Hudson and Rapee (2001)	General	$r = .36^a$	$r = .31^a$	-	-	-
Kohlmann et al. (1988)	General	-	Mo: $r = .04$ – $.08$ Warm Fa: $r = .07$ – $.14$ Warm	-	-	Mo: $r = .48$ – $.52^{**}$ Incons Fa: $r = .36$ – $.48^{**}$ Incons
McClure et al. (2001)	General	$r = .11^*$ \diamond Psy $r = -.02$ \diamond Beh	$r = .07$ \diamond Warm	-	-	-
Muris et al. (2004)	General	$r = .23^*$	$r = .23^*$ Rej	$r = .26^{**}$	-	-
Niditch and Varela (2012)	General	Mo: $r = .16$ Fa: $r = .10$	Mo: $r = .34^{***}$ Rej Fa: $r = .17$ Rej	-	-	-
Rapee (2009)	General	-	-	$r = .29^{**}$ Adol $r = .11^*$ Par	-	-
van Brakel et al. (2006)	General	$r = .21^{**}$	-	$r = .30^{**}$	-	-
Vazsonyi and Belliston (2006)	General	-	Mo: $r = -.19^{***}$ \diamond Warm Fa: $r = -.14^{***}$ \diamond Warm	-	-	-
Verhoeven, Bögels & van der Bruggen (2012)	General	Mo: $r = -.01$ Mo: $r = .03$ Aut Fa: $r = .23^*$ Fa: $r = -.06$ Aut	Mo: $r = .10$ Rej Fa: $r = .19^*$ Rej	-	-	-
Wolfradt et al. (2003)	General	$r = .26^{***}$ Beh	$r = -.31^{***}$ Warm	-	-	$r = .41^{***}$ Press
Hale III et al. (2006)	Generalized	-	$r = .36^{***}$ \diamond Boys Rej $r = .21^{**}$ \diamond Girls Rej	-	-	-
Muris (2002)	Generalized	Mo: $r = .30^*$ Fa: $r = .22^*$	Mo: $r = .07$ Warm Mo: $r = .13$ Rej Fa: $r = .03$ Warm Fa: $r = .05$ Rej	Mo: $r = .19$ Boys Mo: $r = .37^*$ Girls Fa: $r = .11$ Boys Fa: $r = .28^*$ Girls	-	-
Wilson et al. (2011)	Generalized	$r = .05$ Adol $r = -.004$ Par	$r = -.05$ Warm Adol $r = .08$ Warm Par $r = -.02$ Rej Adol $r = -.06$ Rej Par	$r = -.05$	-	-

Study	Anxiety Type	Overprotection / control	Rejection / warmth	Anxious rearing	Modelling of anxiety / lack of sociability	Other
Caster et al. (1999)	Social	-	-	-	Mo: $r = .21^{***}$ Fa: $r = .20^{***}$	Mo: $r = .19-.21^{***}$ Comm Fa: $r = .18-.20^{***}$ Comm
Fisak and Mann (2010)	Social	-	-	-	$r = .19^{***}$ Model $r = .04$ Sociab	$r = .23^{***}$ Comm
Loukas (2009)	Social	$r = .10$ Boys $r = .02$ Girls	-	-	-	-
Miller et al. (2010)	Social	-	Mo: $r = .09$ Warm Fa: $r = -.14$ Warm	-	-	-

Note. – indicates that this parenting dimension was not measured, *Mo* = mothers, *Fa* = fathers, *Adol* = adolescent report, *Par* = parent reported, *Warm* = warmth/support, *Rej* = rejection, *Aut* = Autonomy granting, *Beh* = behavioural control; *Psy* = psychological control; *Comm* = communication of shame and criticism of adolescent's social interactions and skills, *Incons* = inconsistency of parental feedback, *Press* = parental pressure, *Model* = Parental modelling of social fears, discomfort and avoidance, *Sociab* = Parental sociability and tendency to engage in social situations outside the family, $\diamond = r$ imputed from β coefficients using Peterson and Brown's (2005) imputation approach, ^a = statistical difference between means for adolescent sample not provided, \diamond = items of rejection were reverse scored so that a higher score on this dimension indicates higher levels of warmth and lower levels of rejection, * $p < .05$, ** $p < .01$, *** $p < .001$.

Two studies did not find a significant relationship between adolescent anxiety and adolescent perception of a lack of parental support or acceptance (Kohlmann et al., 1988; McClure et al., 2001). Kohlmann et al. (1988) also examined adolescent perceptions of parental inconsistency, i.e. in the way they deal with the same adolescent behaviour on different occasions, and found a significant relationship between adolescent anxiety and perceptions of both mothers and father's inconsistent parenting, with large effect sizes. While McClure et al. (2001) did not find a significant association between adolescent perceptions of maternal acceptance and adolescent anxiety disorder, they did find a relationship between adolescents' perceptions of maternal acceptance (and psychological control) and adolescent symptoms of co-morbid depression on the Beck Depression Inventory.

Three studies examined the relationship between adolescent anxiety and perceptions of anxious rearing (Muris et al., 2004; Rapee, 2009; van Brakel et al., 2006) and all found higher levels of adolescent anxiety symptoms were significantly associated with higher adolescent perceived parental anxious rearing behaviour, with medium effect sizes. Rapee (2009) found this association was also significant when parents rated their adolescent's anxiety symptoms, but with a small, rather than medium, effect size. Van Brakel et al. (2006) looked at adolescent gender and found that neither the results for boys nor girls differed significantly from the results obtained for the total group. In addition, Muris et al. (2004) examined whether the relationship between adolescent anxiety symptoms and their perception of parental anxious rearing behaviours was mediated by perceived control but found this was not the case.

Generalized anxiety symptoms and parenting.

Both Muris (2002) and Wilson et al. (2011) assessed symptoms associated with generalized anxiety in adolescents using the Penn State Worry Questionnaire (Chorpita et al., 1997; Meyer, Miller, Metzger, & Borkovec, 1990) and adolescents' perceptions of parenting using the EMBÜ-C (Castro et al., 1993). While Muris (2002) found adolescent's perceptions of both their mothers' and fathers' over-protection correlated significantly with adolescent worry, with small to medium effect sizes, this was not found by Wilson et al. (2011), using either adolescent or parent reports of parenting. While mean levels of adolescents' ratings of parental overprotection in the two studies were very similar, the mean age of the adolescents were a little higher in Muris' study and this may account for the difference in findings.

Neither Muris (2002) nor Wilson et al. (2011) found a significant association between adolescent worry and perceptions of parental rejection or lack of warmth. Hale III et al. (2006), in contrast, did find significant associations between perceptions of parental rejection and adolescents generalized anxiety symptoms for both boys and girls. This study is similar in methodology to the other two studies, in that adolescents completed self-report measures of anxiety and parenting in a school environment but differed in terms of the study location and measures used to assess symptoms of generalized anxiety and perceptions of parenting and these differences may account for the conflicting findings.

Muris (2002) and Wilson et al. (2011) also examined perceptions of parental anxious rearing; Muris (2002) found an association with adolescent worry and perceptions of parental anxious rearing based on girls', but not boys', reports, with medium to large effect sizes. Wilson et al. (2011) did not find a significant association between adolescent worry and perceptions of anxious rearing and did not find any significant differences between male and female adolescents on any variable. Notably, Wilson et al. (2011) also found that there was little concordance between adolescent-reported and parent-reported parenting dimensions.

Social anxiety symptoms and parenting.

Three studies (Caster et al., 1999; Fisak & Mann, 2010; Loukas, 2009) examined the relationship between adolescent symptoms of social anxiety on the Social Anxiety Scale for Adolescents (SAS-A) (La Greca & Lopez, 1998) and perceptions of parenting in adolescents from community populations. Loukas (2009) did not find a significant association between social anxiety symptoms and perceptions of maternal psychological control, whereas the two other studies (Caster et al., 1999; Fisak & Mann, 2010), that compared adolescents with higher levels of social anxiety symptoms to those with lower levels of symptoms, found significant differences between

groups on adolescents' perceptions of parenting attitudes and behaviour. Both studies found that adolescents with higher levels of social anxiety perceived their parents to be significantly more ashamed of their social interactions and social skills and more concerned about other people's opinions, with small effect sizes. Fisak and Mann (2010) also found adolescents with higher levels of anxiety reported that their parents were significantly more likely to model social fears, social discomfort and avoidance. The more socially anxious adolescents in Caster et al.'s (1999) study were more likely to report that their parents were less socially active, however this was not found by Fisak and Mann (2010). Differences between findings in the two studies may reflect differences in self-report measures used to assess parental sociability, that the adolescents in Caster et al.'s (1999) study were younger than those in the study by Fisak and Mann (2010), or differences in the way the two groups in each study were stratified. Specifically, in the Caster et al. (1999) study, the 'high social anxiety' group was comprised of adolescents who had scored at least one standard deviation above their specific gender and grade mean on either a subscale or total score on the SAS-A and the 'low social anxiety' group scored at or below their specific gender and grade mean on all SAS-A subscales and total score, whereas Fisak and Mann (2010) split their sample into two groups, with those scoring 50 or above on the SAS-A in the 'high anxiety' group and those scoring less than 50 in the 'low anxiety' group. Finally, Caster et al. (1999) compared parent's perceptions of their parenting behaviour for high and low socially anxious adolescents and, in contrast to the reports of the adolescents themselves, found no significant differences on the basis of parents' reports.

A further study (Miller et al., 2010) did not find significant associations between adolescent shyness, as rated by teachers, with parents' positive problem-solving, based on parent's report of the extent to which they were warm and responsive in discussing and solving their adolescent's problems with their adolescent.

Longitudinal Findings

General anxiety symptoms and parenting.

Schwartz et al. (2012) used two parent-adolescent interaction tasks to observe and assess family interactions relating to the dimension of parental rejection. Parental responses during a problem-solving task, designed to elicit negative behaviour, were not significantly associated with adolescent anxiety approximately two and a half years later. On an event-planning task designed to elicit positive behaviour, however, higher levels of parental aggressive behaviour predicted higher levels of anxiety symptoms in adolescents two and a half years later in both boys and girls with a medium effect size after controlling for baseline symptoms.

Generalized and separation anxiety symptoms and parenting.

Wijsbroek et al. (2011) examined the direction of effects between adolescents' perceptions of parental behavioural and psychological control and their self-reported symptoms of generalized anxiety and separation anxiety. The study involved collecting data for two groups of adolescents at three time-points, but for the purposes of this review only the comparisons for the early adolescent group across the second and third time points will be reported as the age of these adolescents fell within the age range of 11-18 years. They found that higher levels of perceived parental control were significantly associated with a greater increase in adolescent generalized and separation anxiety symptoms over time, with small effect sizes. These associations were significant for both perceived psychological and behavioural control, but psychological control showed marginally stronger effects. Prospective associations between earlier adolescent anxiety and increases in perceived parental control over time were less consistent. Higher levels of adolescent generalized anxiety symptoms were significantly associated with a greater increase in perceptions of parental psychological control for both genders with medium effect sizes, and behavioural control for girls with small effect sizes. However, higher levels of adolescent separation anxiety symptoms were only significantly associated with a greater increase in perceptions of parental psychological control for boys, with medium effect sizes. Thus, associations between prior adolescent anxiety and later perceived parental control were stronger when generalized anxiety symptoms were considered compared to separation anxiety symptoms and, as was found for the reciprocal relationship, effects appeared to be stronger for perceived psychological rather than behavioural control.

Table 3: Longitudinal associations between adolescent anxiety symptoms by anxiety type and parenting dimensions of control and rejection/warmth.

Study	Anxiety Type	Control ↓ Anxiety	Rejection/Warmth ↓ Anxiety	Anxiety ↓ Control	Anxiety ↓ Rejection / Warmth
Schwartz et al. (2012)	General	-	$r = .10$ Rej PS $r = .24^{**}$ Rej EP	-	-
Wijsbroek et al. (2011)	Generalized	$r = .18^{**}\blacklozenge$ Beh Boys $r = .15^{*}\blacklozenge$ Beh Girls $r = .17^{**}\blacklozenge$ Psy Boys $r = .16^{**}\blacklozenge$ Psy Girls	-	$r = .11\blacklozenge$ Beh Boys $r = .16^{*}\blacklozenge$ Beh Girls $r = .30^{**}\blacklozenge$ Psy Boys $r = .28^{**}\blacklozenge$ Psy Girls	-
	Separation	$r = .16^{*}\blacklozenge$ Beh Boys $r = .14^{*}\blacklozenge$ Beh Girls $r = .17^{**}\blacklozenge$ Psy Boys $r = .20^{**}\blacklozenge$ Psy Girls		$r = .11\blacklozenge$ Beh Boys $r = -.01\blacklozenge$ Beh Girls $r = .25^{**}\blacklozenge$ Psy Boys $r = .14\blacklozenge$ Psy Girls	
Van Zalk and Kerr (2011)	Social	$r = ns$ T2 $r = .14^{*}\blacklozenge$ T3	$r = ns$ Warm T2 $r = ns$ Warm T3 $r = ns$ Rej T2 $r = ns$ Rej T3	$r = .12^{*}\blacklozenge$ T2 $r = ns$ T3	$r = -.09^{**}\blacklozenge$ Warm T2 $r = -.06^{*}\blacklozenge$ Warm T3 $r = .21^{***}\blacklozenge$ Rej T2 $r = ns$ Rej T3

Note. ↓ indicates that the study measured the association between the first term at an earlier time point and the second term at a later time point, – indicates that this parenting dimension was not measured, *Warm* = warmth/support, *Rej* = rejection, *Beh* = behavioural control, *Psy* = psychological control, *PS* = problem-solving interaction task, *EP* = event planning task, *T2* = time point 2, *T3* = time point 3, \blacklozenge = r imputed from β coefficients using Peterson and Brown's (2005) imputation approach, *ns* = not significant and statistic not provided, * $p < .05$, ** $p < .01$, *** $p < .001$.

Social anxiety symptoms and parenting.

Van Zalk and Kerr (2011) examined adolescent shyness and symptoms of social anxiety in relation to parenting and found that adolescent self-rated shyness predicted an increase in perceptions of higher levels of parental control, rejection and decreased warmth a year later, with small effect sizes. They also found that perceptions of parental control predicted adolescent shyness at a third time point, a year later, however, parental rejection and lack of warmth did not predict changes in adolescent anxiety at a second or third time point.

Treatment Study

Garcia-Lopez et al. (2009) examined differences in social anxiety symptoms for adolescents following cognitive behavioural treatment for social anxiety disorder on the basis of whether parents were classified as a showing 'high' or 'low' levels of expressed emotion (EE). Levels of parental expressed emotion were assessed using the Five Minute Speech Sample (FMSS) (Magaña et al., 1986); parents who expressed one or more comments coded as reflecting criticism, hostility or emotional involvement were defined as 'high' EE ($n = 6$), whereas others were defined as 'low' EE ($n = 10$). They found no significant differences between the two groups on change in social anxiety symptoms ($p = .19$). For both groups, the difference in social anxiety symptoms between pre-treatment scores and scores at post-treatment and follow-up was large (low EE group, $r = .67-.69$; high EE group, $r = .53-.54$).

Discussion

The aim of this systematic review was to examine the evidence for an association between parenting behaviours and anxiety in adolescence. The results of the review reveal the existing literature to be a heterogeneous group of studies, largely involving adolescents from community samples and using cross-sectional designs, where adolescents completed self-report questionnaires to measure their symptoms of anxiety and, in most cases, their perceptions of their parent's behaviour.

The Relationship between Adolescent Anxiety and Perceived/Observed Parenting Behaviours

The majority of studies in the review (75%) found significant associations between adolescent anxiety and either observed, or perceptions of, parental control or over-protection, with effect sizes in the small to medium range. The results of the two studies (Van Zalk & Kerr, 2011; Wijsbroek et al., 2011) that examined prospective relationships between adolescent anxiety and perceptions of parental control provided support for bi-directional effects although interestingly, effect sizes were somewhat stronger (with small to medium effects) for adolescent symptoms of anxiety predicting later higher levels of perceived parental control than for perceptions of control predicting later adolescent anxiety. These findings emphasise the need for caution before interpreting significant cross-sectional associations as evidence for a developmental influence of controlling parenting on adolescent anxiety.

The findings relating to the association between adolescent anxiety and perceptions of parental lack of warmth/support or rejecting behaviour were more mixed. 66% of studies examining this parenting dimension found significant associations, with small to medium effect sizes. Of the two studies involving adolescents with a diagnosed anxiety disorder, Hudson and Rapee found higher levels of observed negativity in mothers of anxious adolescents, compared to a non-clinical control group, with a medium effect size, while McClure et al. (2001) failed to find a significant association between adolescent anxiety disorder status and adolescent perceptions of rejecting parental behaviour. Furthermore, contrary to models of the development of anxiety, Van Zalk and Kerr (2011) found the evidence was greater for adolescent social anxiety symptoms predicting later perceptions of parental rejection and lack of warmth than parenting predicting changes in adolescent anxiety. In contrast however, Schwartz et al.'s (2012) study did find an association in this direction, but did find that observed parental rejecting behaviour predicted adolescent anxiety two and a half years later, with a medium effect size. The difference between findings in the two studies is likely to reflect the difference in methodology used, in that Schwartz et al. (2012) study involved observing interactions between parents and their adolescents during a task, while the study by Van Zalk and Kerr (2011) involved adolescent's ratings of parental behaviour (see below for further discussion on the validity of questionnaire measures of parenting). The lack of consistent findings may also reflect differences in anxiety symptoms and measurement; Schwartz et al. (2012) measured general anxiety symptoms using the Beck Anxiety Inventory (Beck, Epstein, Brown, & Steer, 1988) whereas van Van Zalk and Kerr (2011) specifically measured social anxiety symptoms. As such, the discrepant findings may suggest that associations between parenting behaviours and anxiety symptoms are disorder subtype specific. This suggestion warrants further examination.

The majority of cross-sectional studies (80%) also provided support for an association between adolescent anxiety symptoms and perceptions of anxious rearing behaviour, with most studies finding medium effect sizes. Unfortunately there were no longitudinal studies that examined this parenting dimension in order to clarify the direction of effects and because this is a broad concept, which refers to young people's perceptions of their parents' thoughts and behaviours, it is unclear what this scale is measuring exactly. As is discussed further below, investigation of the validity of these parenting scales is required.

Methodological Issues

The majority of the studies that were reviewed were cross-sectional and therefore interpreting the results is problematic as the direction of effects cannot be established. As outlined earlier, it may be that parental controlling or rejecting behaviour influences the development and maintenance of adolescent anxiety symptoms, by preventing the adolescent from developing their sense of self-efficacy and undermining their emotion regulation and so increasing their sensitivity to anxiety (e.g. Chorpita & Barlow, 1998; McLeod et al., 2007). The results of Van Zalk and Kerr (2011) and Schwartz et al. (2012) provide some preliminary support for this hypothesis. Notably, Schwartz et al. (2012) found a significant prospective association between observed (rather than reported) parental rejecting behaviour and change in adolescent anxiety over time, with a medium effect size. It may be, however, that adolescent symptoms of anxiety lead to changes in parental behaviour as the parent attempts to manage their adolescent's anxiety or reacts in a negative way as a result of the stress caused by the adolescent's anxiety. Again, prospective studies (Van Zalk & Kerr, 2011; Wijsbroek et al., 2011) provide some preliminary support for this

hypothesis in relation to adolescent perceptions of both parental control and rejection. It may also be that another variable, such as adolescent (and/or parental) anxiety, explains the association between perceived parenting and adolescent anxiety. The majority of studies rely on adolescents' report of their parent's behaviour and it is therefore possible that adolescents with higher levels of anxious symptoms may recall, attend to and interpret information negatively (Hadwin, Garner, & Perez-Olivas, 2006); in other words, adolescent's responses on measures of parenting may be more of a reflection of their own anxious cognitions than how their parents are behaving. More generally, a reliance on adolescent reports of parental behaviour is problematic as parenting questionnaires have received little evaluation of their validity and the association between perceived and observed parenting tends to be weak (e.g. Dishion, Li, Spracklen, Brown, & Haas, 1998). Only three studies (Caster et al., 1999; Verhoeven et al., 2012; Wilson et al., 2011) administered parenting questionnaires to both adolescents and parents. Caster et al. (1999) found moderate but consistent associations between adolescent and parent reports of family environment on a modified version of the Parent Attitudes Toward Child-Rearing Scale (Bruch, 1989). Verhoeven et al. (2012) found low to moderate agreement between their broader sample of children and adolescents and parents on the Rearing Behaviour Questionnaire (RBQ: Bögels & Van Melick, 2004) and items from Child Report of Parental Behaviour Inventory (CRPBI: Schaefer, 1965), although using child/adolescent-only report, parent-only report or a combination of the two did not change their findings. Wilson et al. (2011), however, found that there was little concordance between adolescent-reported and parent-reported parenting dimensions on the EMBÜ-C (Castro et al., 1993). Parents may also be unreliable reporters of their own parenting behaviour parents, however, as they may be inclined to portray themselves in a positive light (Schwarz, Barton-Henry, & Pruzinsky, 1985). At a more general level, using single informants to report on parenting and anxiety symptoms is problematic as associations may be due to shared methods variance and not due to a true relationship between the constructs (Barker, Pistrang, & Elliott, 1994).

The Findings of the Review In Relation To the Broader Literature

The pattern of results from the review is broadly consistent with the results of reviews of parenting and anxiety in children that have included broad age ranges (e.g. McLeod et al., 2007; van der Bruggen et al., 2008) and suggests that the association between child anxiety and perceived parental control applies in adolescence. Both McLeod et al. and van der Bruggen et al. found medium sized associations between parental control and child anxiety when studies including broader age ranges were included, whereas this review found effect sizes in the small to medium range. This may reflect parental behaviours having less influence on the young person's symptoms of anxiety as children move in to adolescence, or that parents may adapt their behaviour to be less controlling as their offspring get older. Alternatively the more modest findings may reflect methodological differences between the studies in the different reviews. McLeod et al. (2007) found stronger effects for studies involving participants with a diagnosed anxiety disorder, using observers to report upon parenting and for studies with higher quality measurement of parenting practices. Notably this review included only three studies which included adolescents with an anxiety disorder diagnosis and only two studies involved observational methods. These study characteristics may account for the smaller effect sizes found across this review.

This review demonstrated mixed support for associations between adolescent anxious symptoms and perceptions of rejection or a lack of warmth and observed parental rejection; where there were significant associations, effect sizes were in the small to medium range. McLeod et al.'s (2007) meta-analysis of studies, including children and adolescents, found rejection and a lack of warmth to be less strongly associated with child anxiety than parental control and an overall small effect size. It is too early to know whether the small to medium effects sizes found in this review represents higher levels of rejection and a lack of warmth in parents of adolescents with anxiety. If this were the case, however, it may reflect higher levels of conflict between adolescents and their parents during this period as the family negotiates issues of control and autonomy (Paikoff & Brooks-Gunn, 1991; Steinberg, 1990) and/or higher levels of co-morbid mood disorders in adolescents with anxiety, compared to children (e.g. Kendall et al 2010).

Strengths of the Review

One of the strengths of this review is the exclusive focus on the adolescent developmental period. Given that adolescence is a distinct, critical, transitional period between childhood and adulthood and a time of huge biological, psychological and social change (Erikson, 1968; Feldman & Elliott, 1990; Holmbeck et al., 2000), then it is important to be able to determine whether anxiety during this developmental stage is associated with particular parenting behaviours that may or may not be seen earlier on in childhood. The restricted age range does mean, however, that some studies were excluded as they included some participants who were outside the stated age range (e.g. Anli & Karsli, 2010; Pedersen, 1994), or in the case of longitudinal studies, there was not a distinct time point where adolescent anxiety and perceptions of parenting were measured when all adolescents were within this age range (e.g. Knappe, Beesdo-Baum, Fehm, Lieb, & Wittchen, 2012; Lieb et al., 2000). Notably, the studies by Knappe et al. (2012) and Lieb et al. (2000) involved adolescents with diagnosed anxiety disorders and found that adolescent perceptions of parental overprotection and rejection were significantly associated with anxiety diagnosis status, which is broadly consistent with the findings of this review. Even after restricting studies to within the adolescent age period, it is likely that there are differences between adolescents in early, middle and late adolescence and the nature of the association with anxiety will be determined by additional factors other than age, such as pubertal status, emotional maturity, peer factors, the educational setting and social context.

An additional strength of this study is the specific focus on adolescent symptoms of anxiety, rather than internalizing symptoms, which include symptoms of anxiety and depression more generally. Consequently, a large number of studies identified through the literature searches were excluded because they measured symptoms of internalizing disorders and did not conduct analyses of anxiety and depression separately (e.g. Brenning, Soenens, Braet, & Bal, 2012; Frye & Garber, 2005; Ha, Overbeek, Vermulst, & Engels, 2009). Their exclusion is warranted in order to be clear that any significant associations cannot be accounted for the presence of depressive symptoms alone. Nevertheless, many adolescents with anxiety disorders will also experience co-morbid depression; for example, Last, Perrin, Hersen and Kazdin (1992) found high rates of lifetime mood disorders among children and adolescents referred for anxiety disorders. Children and adolescents with obsessive compulsive disorder had the lowest rates of lifetime mood disorders (25%), while those with social phobia had the highest rates (56%). Lifetime mood disorders are likely to be higher than current mood disorders, suggesting that it is valid to study anxiety independently of depression, but as the evidence base increases, it will be important to investigate the relative contribution of mood disorders, especially in relation to specific anxiety disorders, such as social phobia.

Limitations of the Review

As already outlined, there are a number of methodological factors that mean that the results of this review should be interpreted with caution. A further limitation is the categorisation of various parenting behaviours within the two broad constructs of control or rejection. In categorising in this way, this review has followed convention and this allows the general pattern of results to be considered, however, items in self-report measures may not always clearly fit into one parenting dimension or may reflect elements of more than one dimension. For example, the construct of anxious rearing typically includes parenting dimensions of over-protection and parental expressions of anxiety (e.g. Rapee, 2009). Wolfradt et al. (2003) examined the construct of psychological pressure which would generally be considered to be a sub-dimension of 'control' but the behavioural characteristics may be more consistent with the dimension of rejection/criticism (e.g. items include 'Mother/Father become quickly furious when I do not do what she/he wants'). As part of their study, Verhoeven et al. (2012) carried out a confirmatory factor analysis and found only moderate correlations between the factors of parental control and autonomy-granting which are commonly conceptualised as the opposite ends of the same construct and that, for perceptions of paternal parenting at least, they were differentially related to adolescent levels of anxiety. Typically the dimension of rejection encompasses critical, aversive or withdrawn behaviour as well as a lack of support, warmth or acceptance but these positive and negative dimensions reflect quite different constructs and it does not necessarily follow that a parent who is unsupportive is also critical towards their child. McLeod et al.'s (2007) meta-analysis showed different effects for subcategories of parenting behaviours within the same dimension, suggesting that dimensions may need to be broken down into more specific components of parenting behaviour as the available evidence base increases.

Of the 22 studies in this review, only three studies included adolescents with an anxiety disorder (Garcia-Lopez et al., 2009; Hudson & Rapee, 2001; McClure et al., 2001) and only the adolescents in Hudson and Rapee's (2001) study were from a referred population. It is unclear whether the findings from studies of non-clinical samples can be generalised to clinical populations or whether adolescents with anxiety disorders are a distinct group with quite different characteristics to adolescents who do not meet criteria for a diagnosis. In addition, as mentioned earlier, there is some evidence that the presence of an anxiety diagnosis moderates the association between childhood anxiety and parenting (McLeod et al., 2007) and that there are significantly higher effect sizes in clinically anxious groups than those without a diagnosis. In addition, none of the studies reviewed examined perceptions of parenting in relation to symptoms of obsessive compulsive disorder, panic/agoraphobia or specific phobia. Although the results of the studies in the review appeared to be fairly consistent across symptoms of different anxiety subtypes, we remain unclear as to the extent to which they are generalizable to these anxiety symptoms.

Conclusion and Future Directions

The results of this systematic review provide preliminary evidence for an association between anxiety and perceived parental control and anxious rearing in adolescence and although the findings for an association between adolescent anxiety and perceived parental rejection and lack of warmth are more mixed, there is some evidence for an association with observed, rather than adolescent reported, parental rejection. Methodological shortcomings in the studies mean that these results should be interpreted with caution. It is of great importance, therefore, that systematic observational and experimental research is conducted that includes adolescents from referred, clinical populations, involving multiple informants and observational methods to assess parenting, to help identify the critical parental processes and clarify the direction of effects.

Recently, treatment studies have begun to focus on adolescents specifically and have involved parents in treatment (e.g. Spence et al., 2011; Wuthrich et al., 2012), however, the contribution of parental involvement to treatment outcome has not been evaluated. Only one small study (Garcia-Lopez et al., 2009) has examined parental factors in relation to treatment. In this study, no significant associations between parental narratives about their child and treatment outcome were found, however the range of coded responses was limited and as such the study was likely to lack sensitivity to detect significant associations. Consequently, it will be important for future research to establish, first, whether identified parental processes are associated with poorer treatment outcome and, second, whether systematically targeting those parental behaviours through treatment is associated with a better outcome for highly anxious adolescents.

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